

# Macro Grid Initiative

An **ACORE** Program

## TRANSMISSION & CLIMATE CHANGE

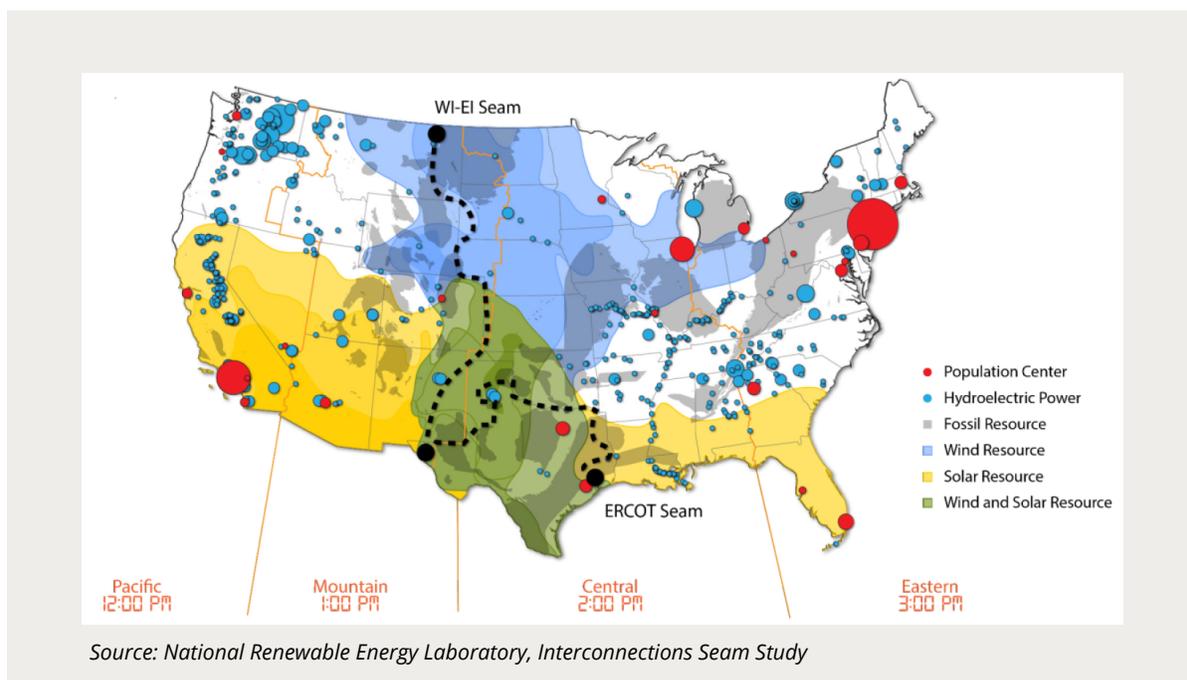
*High-voltage interregional and interstate transmission infrastructure can enable the high penetration of renewable resources necessary to meet carbon emission reduction goals.*

## THE CHALLENGE

Addressing climate change demands large-scale solutions. In 2010, renewable resources supplied 11% of the electricity sold in the United States. To get to net-zero carbon emissions by 2050 – a target set by the Intergovernmental Panel on Climate Change (IPCC) – experts project that percentage will need to grow to 75-80%.<sup>1</sup> According to the IPCC and experts, these goals require additional transmission to connect desired resources to where the power is needed.

America's largest renewable resources are located far from energy load centers and need transmission to connect them. Fifteen states between the Rockies and the Mississippi River account for 88% of the country's wind technical potential and 56% of the country's utility-scale solar technical potential but account for only 30% of projected electricity demand by 2050.<sup>2</sup> These resources cannot be developed without a plan for building interregional transmission that can deliver the power to population centers.

States and regions, including New England, New York and California, cannot cost-effectively meet their respective climate goals without access to renewable resources outside their own footprint.<sup>3</sup>



Source: National Renewable Energy Laboratory, *Interconnections Seam Study*

## THE CASE FOR TRANSMISSION

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- ✓ A nationwide, high-voltage direct current (HVDC) network, optimized for the nation's best wind and solar resources, could reduce carbon dioxide emissions from the U.S. electricity sector by up to 80% relative to 1990 levels without an increase in the levelized cost of electricity.<sup>4</sup>
- ✓ A nationwide HVDC network would enable the U.S. to generate 60% of its electricity using wind and solar resources alone.<sup>5</sup>
- ✓ In scenarios where the cost of renewable resources is low relative to gas, consumers could save an estimated \$47.2 billion annually with a unified electrical power system versus a regionally divided one.<sup>6</sup>
- ✓ Additional interregional transmission lines would reduce carbon emissions at a lower cost, according to a recent study conducted for the Midwest regional power system operator.
- ✓ Deploying a nationwide HVDC does not depend on technology breakthroughs; research and development investments would contribute to lowering the cost of deployment.

## BARRIER

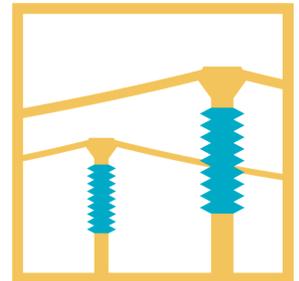
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The difficulty of siting and permitting high-voltage transmission that crosses the boundary between electricity regions hinders the development of transmission that could support the integration of renewable resources.<sup>7</sup>

## SOLUTION

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The U.S. needs a comprehensive planning process that can promote robust expansion of interregional transmission in order to meet ambitious climate change goals.



## SOURCES

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- 1 R.E.H. Sims, R.N. Schock, A. Adegbulugbe, et al., *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, 2007.
- 2 Wind Solar Alliance, *Transmission Upgrades & Expansion: Keys to Meeting Large Customer Demand for Renewable Energy*, 2018.
- 3 WIRES, *Informing the Transmission Discussion*, 2020.
- 4 MacDonald, Clack, et al., *Future cost-competitive electricity systems and their impact on US CO2 emissions*, 2016.
- 5 Ibid.
- 6 Ibid.
- 7 Federal Energy Regulatory Commission, *Report on Barriers and Opportunities for High Voltage Transmission*, 2020.